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EXAMINER	
SMITH, NICHOLAS A	

ART UNIT	PAPER NUMBER
1753	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/769,936	BRUSIC ET AL.
	Examiner	**Art Unit**
	Nicholas A. Smith	1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 July 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-9,23,24,26 and 27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-2,4-9, 23-24 and 26-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. Claims 1-2, 4-9 and 23-24 and 26-27 remain for examination.

Allowable Subject Matter

2. The indicated allowability of claims 3 and 25 is withdrawn in view of the newly discovered reference(s) to "Faraday 1 User's Manual". Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. The term "small" in claims 1, 5, 6, 23 and 26 is a relative term which renders the claim indefinite. The term "small" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-2, 7, 9 and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aberg, "Measurement of Uncompensated Resistance and Double Layer Capacitance during the Course of a Dynamic Measurement: Correction for IR

Drop and Charging Currents in Arbitrary Voltammetric Techniques," *Journal of Electroanalytical Chemistry* **419** (1996) pp. 99-103 as submitted on 1 May 2006 in Applicant's Information Disclosure Statement in view of "Faraday 1 User's Manual," published by *Obbligato Objectives, Inc.* (2000) (*Faraday*).

7. In regards to claim(s) 1, Aberg discloses a method of IR correction in an electrochemical cell, within an electrolyte, at least a working electrode, a counter electrode, and a reference electrode adjacent to the working electrode (p. 101), comprising measuring a voltage transient between the reference electrode and the working electrode resulting from application of a substantially square step function test signal to the electrochemical cell (pp. 100-101), deriving from the voltage transient a measure of the resistive impedance of the electrochemical circuit between and including the working electrode and the reference electrode (p. 100), and subsequently using the measure of resistive impedance to derive an IR correction to the measured voltage between the working electrode and the reference electrode (p. 100). In regards to claim limitation "in an ECMP cell," this limitation is considered intended use and there is no active step or structure differentiating the claimed invention from an electrochemical cell and therefore the limitation is given no patentable weight. See MPEP 2112.

8. In regards to claim(s) 1, Aberg does not explicitly suggest, teach or disclose a method wherein a potentiostat in an IR correction method would have its output modified by a current limiter while applying a small square step function voltage perturbation to the potentiostat input.

9. *Faraday* discloses a potentiostat for electrochemical processes (p. 1). *Faraday* discloses a potentiostat that is current limited (p. 2). It would have been obvious to one of ordinary skill in the art to modify Aberg's method with *Faraday*'s current limiting in order to keep common electroanalytical levels for safety (*Faraday*, p. 2). Therefore, Aberg in view of *Faraday*'s potentiostat's output would be modified by a current limiter. Furthermore, the resulting output would be formed into a substantially square step function if modified by a current limiter when a small square step function voltage perturbation is the input and therefore meets the claimed limitation.

10. In regards to claim(s) 2, Aberg discloses a method comprising using the IR correction to produce a corrected voltage that represents the voltage across a substantially capacitive interface between the working electrode and the electrolyte (p. 100).

11. In regards to claim(s) 7 and 9, Aberg discloses the step of measuring a voltage transient between the reference electrode and the working electrode comprises measuring the voltage between the reference electrode and the working electrode prior to, during, and after the transient and such measurements are taken at substantially the same resolution (p. 101).

12. In regards to claim(s) 23, Aberg discloses a method of IR correction for use in an electrochemical cell having, within an electrolyte, at least a working electrode, a counter electrode, and a reference electrode adjacent to the working electrode (p. 101), comprising applying a substantially square step function test signal to the electrochemical cell (p.101), measuring a voltage transient between the reference

electrode and the working electrode resulting from the application of the test signal the test signal having a start point, wherein the measurement of the voltage transient comprises measuring the voltage between the reference electrode and the working electrode at three times prior to the test signal start point and at three times subsequent to the test signal start point (p. 100-101 and Fig. 1), deriving an extrapolated time-based voltage curve based on the measurements taken subsequent to the test signal start point (p. 100), deriving from the time-based voltage curve a measure of the resistive impedance of the electrochemical cell circuit between and including the working electrode and the reference electrode (p. 100) and subsequently using the measure of resistive impedance to derive an IR correction to the measured voltage between the working electrode and the reference electrode (p. 100).

13. In regards to claim(s) 23, Aberg does not explicitly suggest, teach or disclose a method wherein a potentiostat in an IR correction method would have its output modified by a current limiter while applying a small square step function voltage perturbation to the potentiostat input.

14. *Faraday* discloses a potentiostat for electrochemical processes (p. 1). *Faraday* discloses a potentiostat that is current limited (p. 2). It would have been obvious to one of ordinary skill in the art to modify Aberg's method with *Faraday*'s current limiting in order to keep common electroanalytical levels for safety (*Faraday*, p. 2). Therefore, Aberg in view of *Faraday*'s potentiostat's output would be modified by a current limiter. Furthermore, the resulting output would be formed into a substantially square step

function if modified by a current limiter when a small square step function voltage perturbation is the input and therefore meets the claimed limitation.

15. In regards to claim(s) 24, Aberg is applied to the claims for the same reasons as stated above in paragraph 10.

16. Claims 1-2, 4, 7, 9 and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Champagne et al. (US 5,980,708) as submitted on 1 May 2006 in Applicant's Information Disclosure Statement in view of *Faraday*.

17. In regards to claim(s) 1, Champagne et al. discloses a method of IR correction in an electrochemical cell, within an electrolyte, at least a working electrode, a counter electrode, and a reference electrode adjacent to the working electrode, comprising measuring a voltage transient between the reference electrode and the working electrode resulting from application of a substantially square step function test signal to the electrochemical cell, deriving from the voltage transient a measure of the resistive impedance of the electrochemical circuit between and including the working electrode and the reference electrode, and subsequently using the measure of resistive impedance to derive an IR correction to the measured voltage between the working electrode and the reference electrode (col. 4, line 18 to col. 8, line 29, Figures 1, 16a-e). In regards to claim limitation "in an ECMP cell," this limitation is considered intended use and there is no active step or structure differentiating the claimed invention from an electrochemical cell and therefore the limitation is given no patentable weight. See MPEP 2112.

18. In regards to claim(s) 1, Champagne et al. does not explicitly suggest, teach or disclose a method wherein a potentiostat in an IR correction method would have its output modified by a current limiter while applying a small square step function voltage perturbation to the potentiostat input.

19. *Faraday* discloses a potentiostat for electrochemical processes (p. 1). *Faraday* discloses a potentiostat that is current limited (p. 2). It would have been obvious to one of ordinary skill in the art to modify Champagne et al.'s method with *Faraday*'s current limiting in order to keep common electroanalytical levels for safety (*Faraday*, p. 2). Therefore, Champagne et al. in view of *Faraday*'s potentiostat's output would be modified by a current limiter. Furthermore, the resulting output would be formed into a substantially square step function if modified by a current limiter when a small square step function voltage perturbation is the input and therefore meets the claimed limitation.

20. In regards to claim(s) 2, Champagne et al. discloses a method comprising using the IR correction to produce a corrected voltage that represents the voltage across a substantially capacitive interface between the working electrode and the electrolyte (col. 4, line 18 to col. 8, line 29).

21. In regards to claim(s) 4, Champagne et al. discloses converting the voltage transient to a digital representation thereof and deriving from the digital representation a measure of the resistive impedance of the cell (col. 4, line 18 to col. 8, line 29, Figure 1).

22. In regards to claim(s) 7 and 9, Champagne et al. discloses the step of measuring a voltage transient between the reference electrode and the working electrode

comprises measuring the voltage between the reference electrode and the working electrode prior to, during, and after the transient and such measurements are taken at substantially the same resolution (col. 4, line 18 to col. 8, line 29, Figures 1, 16a-e).

23. In regards to claim(s) 23, Champagne et al. discloses a method of IR correction for use in an electrochemical cell having, within an electrolyte, at least a working electrode, a counter electrode, and a reference electrode adjacent to the working electrode, comprising applying a substantially square step function test signal to the electrochemical cell, measuring a voltage transient between the reference electrode and the working electrode resulting from the application of the test signal the test signal having a start point, wherein the measurement of the voltage transient comprises measuring the voltage between the reference electrode and the working electrode at three times prior to the test signal start point and at three times subsequent to the test signal start point, deriving an extrapolated time-based voltage curve based on the measurements taken subsequent to the test signal start point, deriving from the time-based voltage curve a measure of the resistive impedance of the electrochemical cell circuit between and including the working electrode and the reference electrode and subsequently using the measure of resistive impedance to derive an IR correction to the measured voltage between the working electrode and the reference electrode (col. 4, line 18 to col. 8, line 29, Figures 1, 16a-e).

24. In regards to claim(s) 23, Champagne et al. does not explicitly suggest, teach or disclose a method wherein a potentiostat in an IR correction method would have its

output modified by a current limiter while applying a small square step function voltage perturbation to the potentiostat input.

25. *Faraday* discloses a potentiostat for electrochemical processes (p. 1). *Faraday* discloses a potentiostat that is current limited (p. 2). It would have been obvious to one of ordinary skill in the art to modify Champagne et al.'s method with *Faraday*'s current limiting in order to keep common electroanalytical levels for safety (*Faraday*, p. 2). Therefore, Champagne et al. in view of *Faraday*'s potentiostat's output would be modified by a current limiter. Furthermore, the resulting output would be formed into a substantially square step function if modified by a current limiter when a small square step function voltage perturbation is the input and therefore meets the claimed limitation.

26. In regards to claim(s) 24, Champagne et al. is applied to the claims for the same reasons as stated above in paragraph 20.

27. Claims 5-6 and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aberg or Champagne et al. in view of *Faraday* as applied to claims 2 or 24 stated above, and in further view of Weihs et al. (US 6,171,467) as submitted on 2 February 2004 in Applicant's Information Disclosure Statement.

28. In regards to claim(s) 5-6 and 26-27, Aberg or Champagne et al. in view of *Faraday* does not specifically disclose an active step of controlling the voltage across the substantially capacitive interface to within a substantially small variance from a predetermined value.

29. Weihs et al. discloses an electrochemical polishing system. Weihs et al. teaches that controlled voltage allows growth of a layer (col. 3, lines 24-48), it would have been obvious to one of ordinary skill in the art to modify Aberg or Champagne et al. in view of *Faraday*'s method with Weihs et al.'s control of voltage in order to allow growth of a layer (Weihs et al., col. 3, lines 24-48). While Weihs et al. does not specifically disclose the variance at which the voltage is controlled, it would have been obvious to one of ordinary skill in the art to acknowledge that one would want to keep a constant value as much as is possible to for film/layer uniformity. "Small" is only a relative term and thus would not distinguish from the art in any patentable manner. Furthermore, in regards to claim(s) 6 and 27, it would have been obvious to one of ordinary skill in the art to control the voltage as tightly as possible in Aberg or Champagne et al. in view of *Faraday* and in further view of Weihs et al.'s method and thus meet the claimed limitation.

30. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aberg or Champagne et al. in view of *Faraday* as applied to claim 7 stated above, and in further view of (no reference).

31. Aberg or Champagne et al. in view of *Faraday* does not specifically disclose making measurements with different temporal resolution before or after a square step, however, it would have been obvious to one of ordinary skill in the art to have a higher scan rates during the "active" portion of the electrochemical process, in that, the prior to and after portions would serve as a baseline.

Conclusion

32. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nicholas A. Smith whose telephone number is (571)-272-8760. The examiner can normally be reached on 8:30 AM to 5:00 PM, Monday through Friday.

33. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy Tsang-Foster can be reached on (571)-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

34. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

NAS

Susy Tsang Foster

SUSY TSANG-FOSTER
PRIMARY EXAMINER